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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			PRICE, ELVIS O	
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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Paper No. 4/13/2004

Application Number: 09/618,044  
Filing Date: July 17, 2000  
Appellant(s): POMPETZKI ET AL.

Fredrick D. Vastine, Ph.D.  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 1/22/2004.

***Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

***Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

***Status of Claims***

The statement of the status of the claims contained in the brief is correct.

***Status of Amendments After Final***

The appellant's statement of the status of amendments contained in the brief is correct.

***Summary of Invention***

The summary of invention contained in the brief is correct.

***Issues***

The appellant's statement of the issues in the brief is substantially correct. The changes are as follows: Whether claims 1-2 and 5-17 (not claims 1-3 and 5-17) stand properly rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuhara et al. {US Pat. 5,081,321}, in view of Hiles et al. {US Pat. 4,626,604}, further in view of Sigma Catalog (pg. 1681 of 1994 catalog).

***Grouping of Claims***

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Appellant's brief includes a statement that claims 2, 5-11 and 13-15 do not stand or fall together (with claim 1) and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

### ***Claims Appealed***

The copy of the appealed claims contained in the Appendix to the brief is correct.

### ***Prior Art of Record***

<b>5,081,321</b>	<b><i>Fukuhara et al.</i></b>	<b>1-1992</b>
<b>4,626,604</b>	<b><i>Hiles et al.</i></b>	<b>12-1986</b>
<b><i>Sigma Catalog</i></b>	<b><i>pp. 1681.,</i></b>	<b>1994 ed.</b>

### ***Grounds of Rejection***

The following ground(s) of rejection are applicable to the appealed claims:

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 and 5-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuhara et al. {U.S. Pat. 5,081,321}, in view of Hiles et al. {U.S. Pat. 4,626,604}.

Appellants claim a process for the hydrogenation of acetone, which comprises: conducting the liquid-phase hydrogenation of acetone having a water content of less

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than or equal to 1.0% by weight in at least two hydrogenation process stages, thereby preparing isopropanol product.

Fukuhara et al. teach a process for the hydrogenation of acetone, which comprises conducting the liquid-phase hydrogenation of acetone in a reactor to produce isopropanol, in which a nickel containing catalyst supported on neutral alumina may be utilized as the hydrogenation catalyst and the reaction temperature is from room temperature to 200<sup>0</sup> C and reaction pressure is from 2 to 50 bar (Col. 2, lines 20-40). The conversion and the yield of the isopropanol is 99.9%, respectively (see Example 1). The difference between Appellants ' claimed invention and the Fukuhara et al. invention is that the Fukuhara et al. reference is silent about multiple hydrogenation stages, the percentage of water contained in the acetone substrate and the percentage of by-products, if any.

Hiles et al. generally teach the unsaturated organic compounds, including acetone, can be hydrogenated to the corresponding product (isopropanol from acetone) utilizing multi-stage hydrogenation reactions (Col. 5, lines 14-45 and Col. 7, lines 50-59). Hiles et al. employ the multi-stage hydrogenation process to affect a greater conversion of the unsaturated organic compound to be hydrogenated to the corresponding product (see abstract)

It would have been *prima facie* obvious to one of ordinary skill in the art to prepare isopropanol by hydrogenating acetone as presently claimed, because Fukuhara et al. teach that acetone can be hydrogenated, in the liquid-phase, to produce isopropanol and Hiles et al. teach that compounds such as acetone can be

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hydrogenated in a multi-stage hydrogenation process. Even though the Fukuhara et al. reference is silent about the water content in the acetone, there is no reason for the skilled artisan to believe that the Fukuhara et al. process does not utilize acetone having a water content of less than or equal to 1.0% by weight considering the high conversion and yield of the isopropanol product.

One of ordinary skill in the art desiring to prepare highly pure isopropanol (more pure than that cited in the Fukuhara et al. reference) would have been motivated, in view of the Hiles et al. teachings, to incorporate additional hydrogenation stages, so as to optimize the total conversion of the isopropanol product, because Hiles et al. teach a multi-stage hydrogenation process, in which an unsaturated organic compound such as acetone is hydrogenated, can affect a greater conversion of the acetone to the corresponding hydrogenated product. The instantly claimed process would therefore have been obvious to one of ordinary skill in the art.

#### ***Consideration of the Declaration***

The (corrected) Declaration under 37 C.F.R. 1.132, filed June 4, 2002 (see also the Declaration filed 7/13/2001), has been considered but does not place the application in condition for allowance.

The (corrected) Declaration under 37 CFR 1.132 filed June 4, 2002 (see also the Declaration filed 7/13/2001) is insufficient to overcome the rejection of claims 1-2 and 5-17 based upon the rejection under 35 U.S.C. 103(a) as set forth in the last Office action because:

The facts presented are not germane to the rejection of issue. Specifically, appellants have submitted evidence, by way of comparative experiments, which demonstrates that the content of water contained in the acetone to be hydrogenated (1% or less water), via the presently claimed process, has a material impact on the product composition including undesired byproducts.

The Examiner maintains that the acetone used in the Fukuhara et al. process for hydrogenation acetone contains an amount of 1% or less of water, considering that commercially available acetone contains less than 1% by weight of water (Sigma Catalog: pg. 1681 of 1994 catalog). Appellants have not provided any evidence to show that Fukuhara et al. are not using commercially available acetone in their hydrogenation process.

In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.

#### ***Response to Arguments***

Appellants' arguments, filed 6/20/02 and 1/22/04, have been fully considered but they are not persuasive.

Appellants argue that the essential features of the presently hydrogenation process are that the acetone reactant contains no more than 1% by weight water and that the hydrogenation process be conducted in at least two hydrogenation stages. These essential features of the present process result in the production of an isopropanol product in high yield and purity as demonstrated by the table of the declaration executed June 4, 2002.

This argument is not convincing because the Fukuhara et al. process comprises the liquid-phase hydrogenation of acetone to produce isopropanol and appellants claims comprise a liquid-phase hydrogenation of acetone having a water content of less than or equal to 1.0% by weight in at least two hydrogenation process stages, thereby preparing isopropanol. Even though the Fukuhara et al. reference is silent about the water content in the acetone, there is no reason for the Examiner to believe that the Fukuhara et al. process does not utilize acetone (commercially available acetone) having a water content of less than or equal to 1.0% by weight considering the high conversion and yield (99.9% and 99.9%, respectively) of the isopropanol product. Thus, the skilled artisan would have ventured to use commercially available acetone, absent any teaching to the contrary, in the Fukuhara et al. process. The Examiner would also like to call to appellants' attention that commercially available acetone contains less than 1.0% by weight of water, as exemplified in the Sigma Catalog (see pg. 1681 of 1994 catalog).

Appellants argue that the Fukuhara et al. reference appears to be of secondary interest because the reference discloses an entirely different process of hydrogenating acetone, which entails a fixed bed reaction system having a granular or particulate catalyst therein. In this reactor configuration, it is essential to conduct the direction of flow of reactant liquid and hydrogen gas over the catalyst in a specific direction. That is, it is critical to provide a co-current liquid/gas down-flow relative to the fixed bed catalyst and to maintain the catalyst in a trickle bed state.



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This argument is unpersuasive because appellants have generally claimed a process for hydrogenating acetone, which comprises conducting the liquid-phase hydrogenation of acetone having a water content of less than or equal to 1.0% by weight in at least two hydrogenation process stages, thereby preparing isopropanol. Fukuhara et al. explicitly teach a process for the hydrogenation of acetone, which comprises conducting the liquid-phase hydrogenation of acetone in a reactor to produce isopropanol, in which a nickel containing catalyst supported on neutral alumina may be utilized as the hydrogenation catalyst and the reaction temperature is from room temperature to 200<sup>0</sup> C and reaction pressure is from 2 to 50 bar (Col. 2, lines 20-40 and Example 1). Since Fukuhara et al. is silent about the water content in the acetone, there is no reason for the skilled artisan to believe that Fukuhara et al. have not use commercially available acetone to carry out their process and thus, the skilled artisan would have ventured to use commercially available acetone to produce isopropanol via the Fukuhara et al. process.

Appellants argue that the Hiles et al. reference is directed to a different aspect of aldehyde (ketone) hydrogenation which aspect of improvement of the catalytic hydrogenation of aldehydes is to conduct the hydrogenation in at least three hydrogenation zones.

The Examiner applied the Hiles et al. reference to address the multi-stage (at least two) hydrogenation limitation that was not taught in the Fukuhara et al. hydrogenation process. Since appellants have claimed at least two hydrogenation process stages in the hydrogenation of the presently claimed acetone, then the Hiles et

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al. reference is considered by the Examiner to be pertinent, analogous prior art which in fact teaches that it is advantageous to implement a multi-stage hydrogenation of unsaturated organic compounds, such as acetone, to produce the corresponding hydrogenated product with reduced byproduct formation (see Col. 5, lines 14-45 and Col. 7, lines 50-59). The skilled artisan then would be motivated, in view of the Fukuhara et al. and Hiles reference, to prepare isopropanol as presently claimed by purchasing commercially available acetone and hydrogenate the acetone via a multi-stage hydrogenation process so as to effect the optimum conversion of the acetone and yield of the isopropanol product while reducing by-product formation.

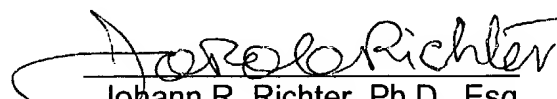
For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Elvis O. Price, Ph.D.

April 16, 2004

  
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